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Effect of relative humidity on the aerosolization and total inflammatory potential of fungal particles from dust-inoculated gypsum boards.

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Abstract

The aim of this study was to investigate the effect of relative humidity (RH) on the aerosolization and total inflammatory potential (TIP) of microbial particles released from gypsum boards inoculated with dust samples from homes. After microbial colonization, the gypsum boards were incubated at either high or low RH. The aerosolized particles (0.54-19.8 μm), culturable fungi, β -glucan and the TIP of the aerosolized particles were quantified. Despite the colonization of several fungal groups, *Penicillium* dominated the aerosolized fraction. Higher emission rates of particles and culturable fungi were found from low RH compared with high RH in both the inhalable and particulate matter <1 μm (PM1) fractions, and the TIP was accordingly higher. However, for the aerosolized fractions, the TIP or concentration β -glucan relative to the number of fungi or particles present was higher from high RH compared with low RH. Despite the low number of culturable fungi in PM1, this fraction showed a high TIP, and the concentration of β -glucan correlated strongly with the TIP of this fraction. The individual particles of the aerosolized PM1 fraction were more inflammatory than the larger particles of the inhalable fraction, and β -glucan may be an important contributor to the inflammatory potential of the aerosolized particles.

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